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IS 1804 (2004): Steel Wire Ropes - Fibre Main Cores [TXD 9: Cordage]

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(चौथा पुनरीक्षण)

Indian Standard

STEEL WIRE ROPES — FIBRE MAIN CORES — SPECIFICATION

(Fourth Revision)

ICS 77 140 65

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Cordage Sectional Committee TX 09

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Cordage Sectional Committee had been approved by the Textile Division Council

This standard was originally published in 1961 and subsequently revised in 1976 1982 and 1996 The present revision has been taken up to harmonize it with corresponding International Standard ISO 4345 1988 Steel wire ropes — Fibre main cores — Specification In this standard following changes have been made

a) Use of oil based lubricants for the lubrication of fibre core confirming to IS 9182 (Part 1) has been specified
b) Requirement of lay length of fibre main core has been modified to express range of tolerances in place of specific tolerance limit
c) Provision has been made for use of identification tape or marker yarn in the fibre core

In the preparation of this standard considerable assistance has also been derived from BS 525 1991 Fibre core for wire ropes issued by the British Standards Institution

The composition of the Committee responsible for formulation of this standard is given in Annex F

For the purpose of deciding whether a particular requirement of this standard is complied with the final value observed or calculated expressing the result of a test or analysis shall be rounding off in accordance with IS 2 1960 Rules for rounding off numerical values (*revised*) The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

AMENDMENT NO. 1 JUNE 2004
TO
IS 1804 : 2004 STEEL WIRE ROPES — FIBRE MAIN CORES — SPECIFICATION

(Fourth Revision)

(*Page* 5 *clause* **B-2**) — Substitute the following for the existing clause

B-2 Calculate the water soluble acid content, Z, in ml/10 g as follows

$$Z = \frac{V}{m_0}$$

where

m_0 = mass, in g, of the sample, and

V = volume of 0.1 mol/l sodium hydroxide or potassium hydroxide solution, in millilitre

Express the result to the nearest 0.1 ml/10 g.'

AMENDMENT NO. 2 NOVEMBER 2005
TO
IS 1804 : 2004 STEEL WIRE ROPES — FIBRE MAIN CORE — SPECIFICATION

(Fourth Revision)

(*Page* 4 *clause* A-3.3) — Substitute the following formula for the existing

$$M = \frac{m_3}{m_1 - (m_3 + m_5)} \times 100$$

(TX 09)

Reprography Unit, BIS New Delhi, India

AMENDMENT NO 1 JUNE 2004
TO
IS 1804 2004 STEEL WIRE ROPES — FIBRE MAIN CORES — SPECIFICATION

(Fourth Revision)

(*Page* 5 *clause* **B 2**) — Substitute the following for the existing clause

B 2 Calculate the water soluble acid content Z, in ml/10 g as follows

$$Z \quad \frac{V}{m_0}$$

where

m – mass in g of the sample and

V volume of 0 1 mol/l sodium hydroxide or potassium hydroxide solution in millilitre

Express the result to the nearest 0 1 ml/10 g

(TX 09)

Reprography Unit, BIS New Delhi India

Indian Standard

STEEL WIRE ROPES — FIBRE MAIN CORES — SPECIFICATION

(Fourth Revision)

1 SCOPE

1 1 This standard specifies the construction particulars and other requirements of fibre main cores for steel wire ropes using two types of fibre

a) Natural and
b) Man made

1 2 This standard is not applicable to ropes for mine hoisting purposes

NOTE — Fibre cores may be adversely affected by h gh ambient temperatures and as such when selecting fibre cores the limitat on of specific fibres in this respect should be taken into consideration

2 REFERENCES

The following standards contain provisions which through reference in the text constitute provisions of this standard At the time of publications the editions indicated were valid All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below

IS No	*Title*
2 1960	Rules for rounding off numerical values (*revised*)
3256 1980	Code for inland packaging of ropes and cordages (*first revision*)
7071(Parts 1 to 3) 1989	Ropes and cordages — Methods of physical test (*first revision*)
9182 (Part 1) 1993	Lubricants for wire ropes and fibre cores — Specification Part 1 Lubricants for fibre core of wire ropes
9560 1980	Colour code for identification of ropes and cordages

3 MATERIAL

3 1 Natural Fibre Cores

Natural fibre cores shall be made from virgin long fibres of the following types

a) Soft Fibres for example — Jute and
b) Hard Fibres — Sisal (*Agave* sisalana) or Manila (abaca) (*Musa textilis*)

3 2 Man Made Fibre Cores

Man made fibre cores shall be made entirely from new fibres of the following types

a) Fibre forming polyolefins (that is monofilament film or fibrillated film of polyethylene polypro pylene etc) and
b) Any suitable alternative material agreed to between the purchaser and the supplier

4 CONSTRUCTION

4 1 General

Main cores complying with this standard shall be laid up from at least three strands In case of four strands fibre core support shall be provided Each coil shall be continuous throughout its length without core splices

4 2 Yarn Sizes

The maximum size of yarn used in the manufacture of soft and hard fibre main core shall be as given in Tables 1 and 2 respectively

Table 1 Maximum Yarn Sizes for Soft Fibre Main Cores
(*Clause* 4 2)

Sl No (1)	Nominal Diameter D mm (2)	Nominal Yarn Size k tex (3)
i)	$D < 4\ 5$	0 41
ii)	$4\ 5 < D < 6\ 0$	0 83
iii)	$6 < D < 8$	1 66
iv)	$D > 8$	3 31

Table 2 Maximum Yarn Sizes for Hard Fibre Main Cores

(*Clause* 4 2)

Sl No	Nominal Diameter D mm	Nominal Yarn Size k tex
(1)	(2)	(3)
)	$D < 4 5$	1 6
i)	$4 5 < D < 7 0$	2 8
ii)	$7 < D \leq 12$	3 7
v)	$D > 12$	4 6

NOTE — These sizes are based on the fibre mass of the yarn exclusive of the effect of any dressing Yarn sizes of man made fibres are not specified

5 PHYSICAL REQUIREMENTS

5 1 Core Lubrication

Lubricants used to facilitate the preparation of natural fibres prior to and/or in the process of spinning shall meet the requirements of IS 9182 (Part 1) The water content and core lubricant content shall be determined in accordance with the method specified in Annex A

NOTES

1 Lubricants are not normally used in the spinning of man made fibres

2 The lubricant content of pre lubricated cores should be agreed to between the core manufacturer and the wire rope manufacturer

5 2 Lay Length

The lay length of fibre main cores when determined in accordance with IS 7071(Parts 1 to 3) shall conform to the following requirements

Type of Fibre	*Lay Length*
Natural fibre	
Soft fibre — Jute	between 3 0*D* and 3 5*D*
Hard fibre — Sisal and Manila	between 2 8*D* and 3 2*D*
Man made fibre	between 3 7*D* and 5 0*D*

where

D is the diameter of fibre main cores

6 CHEMICAL CONTENTS

6 1 Water Soluble Acids

The acidity of the core shall not be more than 2 ml of a 0 1 mol/l acid solution per 10 g of core when tested in accordance with the method specified in Annex B

6 2 Salt

The salt content (expressed as a percentage of sodium chloride) shall not be more than 0 3 percent when tested in accordance with the method specified in Annex C

NOTE — Acidity and salt content are normally associated only with natural fibre cores and may not be applicable to man made fibre cores

7 TOLERANCES

7 1 Ordered Length

The tolerances on the ordered length l shall be as follows

$l \leq 400$ m	$^{+5}_{\ 0}$ percent
$l > 400$ m	$^{+20}_{-0}$ m for each 1 000 m or part thereof

7 2 Nominal Diameter and Nominal Runnage

The manufacturer shall declare the nominal diameter and runnage and it shall be subjected to the tolerances given in Table 3 The core diameter and core runnage shall be determined in accordance with method given in Annex D and Annex E respectively

NOTE — The test for core runnage shall be conducted before it has been put into core rope It shall not be used for cores taken from wire ropes

Table 3 Tolerances on Nominal Diameter and Nominal Runnage

(*Clause* 7 2)

Sl No	Type of Fibre	Total Tolerance Range on	
		Nominal Diameter D Percent	Nominal Runnage Percent
(1)	(2)	(3)	(4)
i)	Natural fibres All sizes	$^{+5}_{0}$	$^{+5}_{0}$
ii)	Man made fibre a) 4 mm $\leq D \leq$ 7 mm	$^{+4}_{0}$	$^{+4}_{0}$
	b) $D \geq 7$ mm	$^{+3}_{0}$	$^{+3}_{0}$

8 CORE DESIGNATION

The core shall be designated by its nominal diameter and nominal runnage (mass per unit length) These shall be agreed to between the core manufacturer and the wire rope manufacturer The core manufacturer shall state whether the nominal runnage is based on the lubricated or unlubricated core The core diameter and core runnage shall be determined in accordance with the methods specified in Annex D and Annex E respectively

9 IDENTIFICATION

9 1 If agreed to between the core manufacturer and wire rope manufacturer fibre core shall be marked for identification in accordance with the procedure laid down in IS 9560

9 1 1 The Marker Yarn shall take the place of one of the white yarns Jute yarn provided it is not coarser than 1654 tex (48 gist) may be used but it shall not be taken as a substitute for one of the white yarns in the strand and shall be additional

10 PACKING

The cores shall be supplied unspliced in continuous length in coils or reels No coil shall contain more than one length Each package shall be suitably protected against damage and adverse climatic conditions in transit All ends shall be whipped and tied to prevent unraveling

NOTE — IS 3256 may be followed for packing fibre cores intended for use within the country

11 MARKING

11 1 Each coil/reel shall have a label attached to it on which following shall be clearly and legibly marked

a) Indication of the source of manufacture
b) Type of fibre
c) Nominal diameter in mm
d) Nominal runnage in mass/length and
e) Length of the core in m

11 2 BIS Certification Marking

The coils of fibre cores may also be marked with the Standard Mark

11 2 1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act* 1986 and the Rules and Regulations made thereunder The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from Bureau of Indian Standards

12 SAMPLING AND CRITERIA FOR CONFORMITY

12 1 The coils of core of the same size shall constitute a lot Each sample taken shall be representative of the lot

12 2 The conformity of the lot shall be determined on the basis of tests carried out on the samples selected from it

12 3 Sampling shall be as representative as possible of the lot Draw the samples at random at the rate shown by the following formula

$$S = 0\ 4\sqrt{N}$$

where

S = the number of the coil in the sample and
N = the size of the lot expressed as number of coils

When S is calculated is not a whole number round off the value obtained to a whole number in accordance with IS 2 In case where S is less than 1 draw one coil as sample

12 4 The test sample shall be taken from the coil in such a manner that the lay is not disturbed The piece of core upon which the tests are carried out shall be at least 5 m from the outer end of the coil In case of dispute the coil shall be placed upon a turntable for the purpose of obtaining the sample

12 5 The sample shall be at least 4 m long

12.6 Criteria for Conformity

The lot shall be declared conforming to this standard if the following conditions are satisfied

a) Length of each coil in the sample shall satisfy the declared length
b) Samples tested for core diameter and runnage core lubricant water soluble acids and salt content shall meet the specified/declared requirements
c) The sample shall also meet all other requirements

D-2 Place the sample for measurement at least 3 m long under the reference tension F in newtons calculated from the formula

$$F = \frac{D^2}{0 8}$$

where

D = nominal core diameter in mm

D-3 Measure the core diameter under tension using a sliding caliper having jaws wide enough to cover two strands of the core Carry out the measurements at the two ends and the centre of the 3 m test length measuring two mutually perpendicular diameter at each of these points

D-4 Calculate the mean of these six measurements and record the result in millimetres rounded to the nearest 0 1 mm as the core diameter

The maximum difference between the highest and lowest of the six measurements shall not exceed 5 percent of the nominal diameter This test shall only be used for cores before they have been put into a wire rope It shall not be used for cores taken from wire ropes

ANNEX E

(Clauses 7 2 *and* 8)

DETERMINATION OF CORE RUNNAGE (MASS PER UNIT LENGTH)

E-1 Place the samples for measurement at least 4 m long under a reference tension calculated in accordance with the formula given in Annex D Mark the sample accurately with two marks at least apart while under this reference tension and cut of these marks when the tension is released

E-2 Determine the mass of the cut length of rope to the nearest 0 1 g and express it in mass/length

The tester shall declare whether the runnage refers to a lubricated or an unlubricated core

ANNEX F

(Foreword)

COMMITTEE COMPOSITION

Cordage Sectional Committee TX 09

Organization	*Representative(s)*
Jayashree Fibre Products Kolkata	SHRI N K SOMANI (***Chairman***)
Balaji Ropes Manufacturering Co Pvt Ltd Kolkata	SHRI SANDEEP AGARWAL
C A Polycare Pvt Ltd Kolkata	SHRI U S CHAKRABORTY
Calcutta Port Trust Kolkata	SHRI P L NAG SHRI S K CHATTERJEE (*Alternate*)
Coir Board Alleppey	SHRI P T JOSEPH SHRI K G RAGHAVAN (*Alternate*)
Directorate General of Supplies & Disposals (Inspection Wing) New Delhi	SHRI A K SEHGAL SHRI SUNDER LAL (*Alternate*)
Garware Wall Ropes Ltd Pune	SHRI M P MONE SHRI S J CHITNIS (*Alternate*)
Indian Institute of Technology Delhi	DR R CHATTOPADHYAY
Indian Jute Industries Research Association Kolkata	DR D SUR DR D K MUKHOPADHYAY (*Alternate*)

Organization	*Representative(s)*
Indian Rope Manufacturers Association, Kolkata	SHRI T. BHATTACHARJI
Jayashree Fibre Products, Kolkata	SHRI M. K. B N
M/s Best Cotton Rope Manufacturing Co, Mumbai	SHRI KAN G. THANAWALA SHRI H. M. M. THANAWALA (*Alternate*)
Ministry of Defence (DGQA), New Delhi	SHRI O. P. SHARMA SHRI T. P. SINGH (*Alternate*)
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United Rope Works, Kolkata	SHRI S. N. AGARWAL SHRI A. AGARWAL (*Alternate*)
BIS Directorate General	SHRI P. BHATNAGAR, Director & Head (TXD) [Representing Director General (*Ex-officio*)]

Member Secretary
SHRI B. L. BH R N
Joint Director (TXD), BIS

Bureau of Indian Standards

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